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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314			EXAMINER JUNG, UNSU	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,321	Applicant(s) MANSSON ET AL.	
	Examiner Unsu Jung	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 6, 2007 has been entered.
2. Applicants' amendments to the drawings (Fig.'s 12-15) in the reply filed on February 6, 2007 have been acknowledged and entered.
3. Applicants' amendments to the drawings (Fig.'s 12-15) in the reply filed on February 20, 2007 have been acknowledged and entered.
4. Applicants' amendments to claim 10 in the reply filed on February 6, 2007 have been acknowledged and entered.
5. Claims 10-14 are pending and are under consideration for their merits.

Objections Withdrawn

6. Applicant's arguments, see p3, filed on February 20, 2007, with respect to the objection of the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn in view of the Fig.'s 12-15 in the reply filed on February 20, 2007.

7. Applicant's arguments, see p5, filed on February 6, 2007, with respect to the objection of claim 10 in the Office Action dated October 6, 2006 have been fully considered and are persuasive. The objection of claim 10 in the Office Action dated October 6, 2006 has been withdrawn in light of the amended claim in the reply filed on February 6, 2007.

Rejections Withdrawn

8. Applicant's arguments, see pp6-8, filed on February 6, 2007, with respect to the rejection under 35 U.S.C. 102(b) as being anticipated by Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998) in light of Luscher (U.S. Patent No. 3,585,527, Oct. 27, 1969) have been fully considered and are persuasive. The rejection of claim 10 under 35 U.S.C. 102(b) as being anticipated by Kawakami et al. in light of Luscher has been withdrawn in view of the amended claim 10 in the reply filed on February 6, 2007.

9. Applicant's arguments, see pp6-8, filed on February 6, 2007, with respect to the provisional rejection on the ground of nonstatutory obviousness-type double patenting

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as being unpatentable over claim 22 of copending Application No. 10/542,616 in view of Kawakami et al. have been fully considered and are persuasive. The provisional rejection of claims 10, 12, and 13 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 22 of copending Application No. 10/542,616 in view of Kawakami et al. has been withdrawn in view of the canceled claim 22 in the copending Application No. 10/542,616.

Claim Objections

10. Claim 10 is objected to because of the following informalities: the word "an" in line 2 should be moved to precede the term "individually operating."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claim 10 is rejected under 103(a) as being unpatentable over Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998) in view of Luscher (U.S. Patent No. 3,585,527, Oct. 27, 1969) and constructing a formerly integral structure in various elements involves only routine skill in the art.

Kawakami et al. teaches a multiple piezoelectric crystal microbalance device comprising (see entire document, particularly Fig.'s 1-9):

- a connecting station, 100 and 101, for receiving and an individually operating array of piezoelectric crystal microbalances (reference elements 63 and 64 in Fig. 9);

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- a plurality of piezoelectric crystal microbalances flow-through cells for engaging with the connecting station (Fig.'s 2 and 3), wherein the connecting station comprises:
 - a connecting panel, 112 and 113, (reference elements 10 in Fig. 6) having an array of cell connecting receptors, 118 (reference elements 11a-11c in Fig. 6), each cell connecting receptor comprising a receptor connector portion, 120, (Fig. 6) for automatic mating operative engagement with a cell connector portion, 24, (Fig. 6) of a piezoelectric crystal microbalance flow-through cell, 10, (Fig. 4) upon plugging the flow through cell, 10, into the connecting station, wherein each connector portion comprises:
 - a pair of electric connecting ports, 126 and 128, (reference elements 72 and 73 in Fig. 6) for communication with a power and measurement means, 130; (column 5, lines 52-62) for oscillating a piezoelectric crystal, 50, (reference elements 50a-50c in Fig.'s 2 and 3) carrying electrodes (reference elements 51a-51c in Fig. 7) in a cell compartment, 34, (square pits, column 5, lines 36-41) of one operatively engaged flow-through cell, 10, and for measuring oscillating characteristics of the piezoelectric crystal; and
 - a pair of fluid connecting ports, 122 and 124, (reference elements 61a-61c and 62a-62c in Fig. 1) for communication with flowing means for flowing a solution (75) (column 3, lines 17-30).

Although Kawakami et al. is silent with regards to having two electrodes associated with the piezoelectric crystal (quartz), the crystal/quartz oscillator of Kawakami et al. would intrinsically have two electrodes as evidenced by Luscher, which teaches a well known crystal/quartz oscillator circuit that includes a quartz crystal having two electrodes (see entire document, particularly column 2, lines 30-40).

With respect to the limitation of "for communication with flowing means for uninterrupted flowing of a solution (75) and a test solution aliquot (83) to and through the cell compartment," a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The fluid connecting ports of Kawakami et al. would be expected to provide uninterrupted flowing of a solution and a test solution aliquot through the cell compartment via flowing means.

Moreover, Kawakami et al. differs from the claimed invention in that Kawakami et al. fails to teach that the plurality of piezoelectric crystal microbalance flow-through cells are detachable. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the multiple piezoelectric crystal microbalance device of Kawakami so that the plurality of piezoelectric crystal microbalance flow-through cells are detachable/separable, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179

15. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998) in view of Luscher (U.S. Patent No. 3,585,527, Oct. 27, 1969) as applied to claim 10 above, and further in view of Takeuchi et al. (U.S. Patent No. 6,326,563, Filed Sept. 22, 1999).

Kawakami et al. in view of Luscher teaches the multiple piezoelectric crystal microbalance device as discussed above (see item 14 above). However, Kawakami et al. in view of Luscher fails to teach a multiple piezoelectric crystal microbalance device, wherein the individually operated piezoelectric crystal microbalances are electrostatically and electromagnetically shielded from each other. The current specification discloses that electrostatic and electromagnetic shielding can be provided by enclosing an individually operated piezoelectric crystal microbalance with a metal (p14, lines 6-10).

With respect to claims 12 and 13, Kawakami et al. in view of Luscher teaches a multiple piezoelectric crystal microbalance, wherein the connecting station, 100, comprises connection means for serial or parallel interconnection for the flowing of the solution, 75, and test solution aliquot, 83, to and through the cell compartment, 34, of the individual cells, 10 (column 8, lines 32-40 of Kawakami et al.).

Takeuchi et al. teaches a method of shielding by coating a piezoelectric element with a conductive material such as a metal (see entire document, particularly column 17, lines 29-35). A shield layer consisting of a conductive material reduces external electromagnetic noise and improves measurement sensitivity of the piezoelectric element (column 6, lines 5-9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the multiple piezoelectric crystal microbalance device of Kawakami et al. in view of Luscher with a shield layer consisting of a conductive material such as metal as taught by Takeuchi et al. in order to reduce external electromagnetic noise and improve measurement sensitivity of the piezoelectric element. The advantage of reducing external electromagnetic noise provides the motivation to combine teachings of Kawakami et al. in view of Luscher and Takeuchi et al. with a reasonable expectation of success as the reduction in external electromagnetic noise would provide enhanced measurement sensitivity of the piezoelectric element in the multiple piezoelectric crystal microbalance device.

16. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998) in view of Luscher (U.S. Patent No. 3,585,527, Oct. 27, 1969) as applied to claim 10 above, and further in view of Ricchio et al. (U.S. Patent No. 5,130,095, July 14, 1992).

Kawakami et al. in view of Luscher teaches the multiple piezoelectric crystal microbalance device as discussed above (see item 14 above). However, Kawakami et al. in view of Luscher fails to teach a multiple piezoelectric crystal microbalance device, further comprising grounding means (108) for electrical grounding of the flow solution (75) and the test solution aliquot (83) to the cell compartment (34) of each of the flow-through cell (10).

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Ricchio et al. teaches a flow cell having a solution grounding means on the inlet line for the sample adjacent to the entrance to the flow cell of fluid thereby minimizing electronic noise (see entire document, particularly, Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the grounding means on the inlet line of the flow cell device as taught by Ricchio et al. in the multiple piezoelectric crystal microbalance device of Kawakami et al. in view of Luscher in order to minimize electronic noise. The advantage of minimizing electronic noise provides the motivation to combine teachings of Kawakami et al. in view of Luscher and Ricchio et al. with a reasonable expectation of success.

Double Patenting

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

18. Copending Application 10/539,065

A. Claims 10, 12, and 13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-47 of copending Application No. 10/539,065 in view of Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998).

The copending Application teaches a detachable piezoelectric crystal microbalance comprising:

- a connecting panel (112, 113) having a cell connecting receptor (118), each receptor comprising a receptor connector portion (120) for mating operative engagement with a cell connector portion (24) of each piezoelectric crystal microbalance flow-through cell (10), wherein each connector portion comprises a pair of electric connecting ports (126, 128) for communication with a power and measurement means (130) for oscillating a piezoelectric crystal (50) carrying two electrodes (56, 62) in a cell compartment (34) of one operatively engaged flow-through cell (10) and for measuring oscillating characteristics of the piezoelectric crystal and

- a pair of fluid connecting ports (122, 124) for communication with flowing means for flowing a solution (75) and a test solution aliquot (83) to and through the cell compartment.

However, the copending Application fails to teach a sensor system comprising an array of piezoelectric crystal microbalances.

Kawakami et al. teaches a flow cell apparatus having an array of plate-shaped quartz oscillator (piezoelectric crystal microbalance) with a protein layer as a measuring element to detect adhesion of blood component on the protein layer (see entire document, particularly Abstract). Kawakami et al. teaches a flow connection in both parallel (column 8, lines 32-34) and serial (Fig. 9) manner. Different samples can be supplied using a parallel flow connection (Example 1), while serial flow connection would require only a single pump to deliver one type of blood sample to all the flow cells in an array (Fig. 9 and column 8, lines 38-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the piezoelectric crystal microbalance device of the copending Application in a array format with a serial and a parallel flow connection of the piezoelectric crystal microbalances as taught by Kawakami et al. in order to supply either single sample or a plurality of samples to the piezoelectric crystal balance device for use in an assay to detect blood components.

This is a provisional obviousness-type double patenting rejection.

B. Claim 14 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-47 of copending Application No. 10/539,065 in view of Kawakami et al. (U.S. Patent No. 5,728,583, Mar. 17, 1998) as applied to claim 10 above, and further in view of Ricchio et al. (U.S. Patent No. 5,130,095, July 14, 1992).

The copending Application in view of Kawakami et al. teaches the multiple piezoelectric crystal microbalance device as discussed above (see item 18A above). However, the copending Application in view of Kawakami et al. fails to teach a multiple piezoelectric crystal microbalance device, further comprising grounding means (108) for electrical grounding of the flow solution (75) and the test solution aliquot (83) to the cell compartment (34) of each of the flow-through cell (10).

Ricchio et al. teaches a flow cell having a solution grounding means on the inlet line for the sample adjacent to the entrance to the flow cell of fluid thereby minimizing electronic noise as discussed above (see item 16 above).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the grounding means on the inlet line of the flow cell device as taught by Ricchio et al. in the multiple piezoelectric crystal microbalance device of the copending Application in view of Kawakami et al. in order to minimize electronic noise. The advantage of minimizing electronic noise provides the motivation to combine teachings of the copending Application in

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view of Kawakami et al. and Ricchio et al. with a reasonable expectation of success.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

19. Applicant's arguments with respect to claims 10-14 have been considered but are moot in view of the new ground(s) of rejection. However, the following arguments have been addressed as they may also apply to the current rejection.

Applicant's argument that no housing structure is provided for the oscillator that could be reasonably interpreted as a flow-through cell (p7) is not found persuasive in view of the current rejection as set forth above (see item # above). Kawakami et al. teaches a flow-through cell as illustrated in Fig. 2, in which entrance and exit holes, 22b and 23b, respectively (column 8, lines 32-40), provide flow through cell compartments, which also house the oscillators (50a-c). Therefore, one of ordinary skill in the art would recognize that the each cell compartment of Fig. 2 would represent a flow-through cell.

20. Provisional Double Patenting Rejection

Applicant's request to hold the provisional double patenting rejection on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-47 of copending Application No. 10/539,065 in view of Kawakami et al. in abeyance is acknowledged.

With regards to the clarification request to set forth which claims are relied upon as reciting the features claimed in the instant application, claims 10, 12, and 13 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-47 of copending Application No. 10/539,065 in view of Kawakami et al. (see item 21 in previous Office Action dated October 6, 2006). Specifically claim 43 recites a piezoelectric sensor arrangement (piezoelectric crystal microbalance) comprising a detachable piezoelectric crystal carrying two electrodes and a docking system (connecting panel) having a cell connecting receptor, each receptor comprising a receptor connector portion for mating operative engagement with a cell connector portion of each flow cell element (piezoelectric crystal microbalance flow-through cell) and fluid channels (a pair of fluid connecting ports) for communication with flowing means for uninterrupted flowing of a solution and a test solution aliquot to and through the cell compartment. Further, claim 11 recites each connector portion comprises electrical contacts (a pair of electric connecting ports) for communication with a power and measurement means for oscillating a piezoelectric crystal carrying two electrodes in a cell compartment of one operatively engaged flow-through cell and for measuring oscillating characteristics of the piezoelectric crystal.

21. Since the prior art fulfills all the limitations current recited in the claims, the invention as currently recited would read upon the prior art.

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Conclusion


22. No claim is allowed.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Unsu Jung whose telephone number is 571-272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Unsu Jung, Ph.D.
Patent Examiner
Art Unit 1641


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